author's final results; after having, to his own satisfaction at least, broken down the old land-marks, he proceeds to establish new ones where, according to his own showing, no hard and fast lines exist; he classes the group C as Lower Permian, A as Carboniferous, and parallels B with the Ottweil beds of the Saarbruck coal-field, which by the way are distinguished by the absence of Permian forms. It is further a matter for regret that so painstaking an observer has so little of the gift of lucid arrangement, and that he indulges so largely in what De Quincey calls the carpet-bag treatment of sentences.

But faults like these will not detract from the real value of the work; when the time comes for a rectification of boundaries on the Permo-Carboniferous frontier, the vast mass of carefully-observed facts which it furnishes will form no unimportant contribution to the body of evidence by which the question must be decided. The author may have been premature in his conclusions, but his industry and application have produced a work that will have a permanent value. A. H. G.

OUR BOOK SHELF

Holidays in Tyrol—Kufstein, Klobenstein, and Panveggio. By Walter White. (London: Chapman and Hall, 1876.)

THIS volume may be regarded as the complement to that published a good many years ago by Mr. White, "On Foot through Tyrol," in which the Brenner was the eastern limit. The present one takes us to south-east Tyrol, occasionally overstepping the boundary that divides Austria from Italy. Mr. White is a leisurely tourist, with no ambition to rival the feats of an Alpine clubbist, but with what may be called an epicurean taste for scenery of all kinds. It is this taste which keeps him to the lower heights, for from such vantage-ground alone it is found can all the varied features of the Alpine scenery be fully appreciated and enjoyed. The volume contains the results of several summer sojourns in southern Tyrol, and while its main feature is pleasant chat about the principal scenes that are presented throughout its length and breadth, there is much interesting gossip about its towns and villages, their antiquities, history, and, above all, about the people, with all sorts and conditions of whom the author came much into contact. He has the faculty of making himself at home and liked wherever he goes a pleasuring, and thus has learned much about the sentiments and ways of the people that an ordinary tourist would never discover. There is no excitement, no sensation, no hair-breadth 'scapes in the book; the chapters are very short, and the reader will feel no difficulty in laying it down at the end of any one of them; but at the same time Mr. White's pleasant chit-chat never wearies, but keeps the reader in a constant state of placidity and quiet amusement. The region described is out of the way of the ordinary tourist, but we should think Mr. White's volume ought to make it popular. The work will form a useful guide to the Southern Tyrol, and is interspersed with occasional notes on geology, which gives it a claim to be regarded as not altogether unscientific.

Angling Idylls. By G. Christopher Davies. (London: Chapman and Hall, 1876.)

MR. DAVIES is already favourably known to anglers and natural history amateurs, and many lovers of healthful and refreshing reading, by his "Mountain, Meadow, and Mere," and his "Rambles and Adventures of Our School Field Club." The present volume contains a number of charming pictures of country scenes and country life grouped round angling adventures. The Idylls—prose in form we may say—are put together with great art, which seldom makes itself felt, are simply told, and full of the unmistakable freshness of "out-of-doors," to use the author's synonym for Nature. To a jaded mind they will be found almost as refreshing as a day by a river side with rod and line is to a jaded body. Mr. Davies has a good knowledge of natural history, and knows how to observe and tell what he sees, and both the botanist and zoologist will find something to interest them in the book. Under the title of "Angling Acquaintances" he describes graphically the habits of the otter, water-vole, heron, and other animals to be found in the neighbourhood of water, and does the same in another chapter for "Waterside Plants." For lovers of the country and especially of the gentle craft the book possesses many attractions.

LETTERS TO THE EDITOR

The Editor does not hold himself responsible for opinions expressed by his correspondents. Neither can he undertake to return, or to correspond with the writers of, rejected manuscripts. No notice is taken of anonymous communications.]

Extreme Temperature of Summer

ON Saturday, July 15 last, the temperature (in the shade, four feet from the ground) at the Royal Observatory, Greenwich, rose to 93°·0; on Monday, July 17, to 94°·0; and on Saturday, July 22, to 90°·2.

Since the establishment of the Magnetical and Meteorological Observatory in the year 1840, higher readings than 94°·0 have been recorded on two occasions only; 94°·5 in 1858, June 16, which was very early in the year for so high a temperature; and 96°·6 in 1868, July 22.

The following further particulars collected from the Greenwich records may interest some of your readers.

It appears that the temperature has risen to or above 90°, out of thirty-six years, in twelve years only. The annexed list gives the particular days on which such extreme temperature was shown:—

	°		°
1842, Aug. 10 ...	90·5	1868, July 20 ...	90·0
1846, June 20 ...	91·1	,, ,, 21 ...	92·2
,, July 4 ...	91·8	,, ,, 22 ...	96·6
,, ,, 5 ...	93·3	,, ,, 28 ...	90·1
,, ,, 31 ...	91·3	,, Aug. 5 ...	90·5
,, Aug. 1 ...	92·0	,, Sept. 7 ...	92·1
1852, July 5 ...	90·3	1869, July 22 ...	90·9
1857, June 28 ...	92·7	1870, June 22 ...	90·2
1858, ,, 16 ...	94·5	1872, July 25 ...	90·9
1859, July 12 ...	92·5	1874 ,, 9 ...	92·0
,, ,, 13 ...	92·0	,, ,, 20 ...	91·8
,, ,, 18 ...	93·0	1876 ,, 15 ...	93·0
,, Aug. 25 ...	91·3	,, ,, 17 ...	94·0
1868, July 16 ...	92·0	,, ,, 22 ...	90·2

The years 1846 and 1868 were remarkable for high summer temperature; in 1846, 91°·1 was registered as early as June 20, and in 1868 92°·1, as late as Sept. 7.

Throughout the whole period of thirty-six years, the *earliest* summer maximum occurred in 1862, on May 6, and was 81°·5. The *latest* summer maximum occurred in 1875, on Aug. 16, and was 85°·4. The year 1860 was remarkable for depressed temperature; the highest summer reading having been 75°·0 only, on July 17. The year was one which agriculturists will well remember. It was in violent contrast to 1859, as the table above given shows.

Selecting the highest recorded temperature in each year, from 1841 to 1876, with the day of its occurrence, it appears, on the average of the thirty-six years, that the mean of such highest readings is 88°·3, the corresponding mean day of occurrence being July 11. WILLIAM ELLIS

Royal Observatory, Greenwich, July 24

Earthquakes in Samoa

DURING the months of December and January last there was much local seismic disturbance on the north side of the island of Savaii. Loud underground reports were heard in one particular spot near the coast. They were at irregular intervals, but

were sometimes very frequent. I could not ascertain from any of those resident in the neighbourhood the exact number in any definite time, but for several days they must have been almost hourly. The concussion was felt for a distance of four or five miles only around the focus of action; but it was so severe in the nearest village, that the people deserted their homes during its continuance.

On February 1, at 4.30 P.M., we had a very long shock of earthquake, which was felt all over the group. It lasted within a few seconds of two minutes. The oscillation was very great. The islands seemed to be in the hands of Mafui'e (the earthquake god), and he shook us with a vengeance. I took my watch in hand when I felt the first indication of an earthquake, and sat for a minute amidst the clatter of windows, lamp-glasses, and everything movable (a gentleman writing to me about it next day said his house seemed turned into a factory, with the clatter of machinery), but as it appeared to increase in severity, I deemed it prudent to go outside the house. I then noticed that the thatched roof presented the appearance of waves running rapidly across from south to north. After it was over I found two clocks—one facing north, the other south—had been stopped; one facing west was still going. In three parts of my house the plaster at the angles of walls had been broken down. Bottles were thrown down and broken. In my study, books on a shelf facing north were shaken forward; those on shelves running north and south were not affected. The screw of a copying-press, which I had used just before the earthquake, and which was standing up at the time, had been run down. I found by experiment afterwards that it required a vigorous shake with both hands for half a minute to make the screw run down.

Immediately after the earthquake I went to see if there was any oscillation of the sea. There was nothing perceptible on this—the north—side of the island. I have learned, however, from various sources that there was much oscillation on the south side. Directly after the shaking was over the reef was seen to be bare, and fish were lying exposed on it. The natives rushed to secure the fish, and while they were busy picking them up they were overtaken by a wave, which would have proved fatal to many had they not been expert swimmers. I have heard of only one life lost—a child, who was found next day jammed between two masses of growing coral. It was low water at the time, but low-lying villages were flooded by the wave.

During the following night we had four slight shocks of earthquake, but have had nothing severe since.

Upolu, Samoa, April 3 S. J. WHITMEE

P.S.—I wish to correct a misprint in my letter on "The Degeneracy of Man," which appeared in NATURE, vol. xii., p. 47. In speaking of the language of the Polynesians, I said there are many refinements, a large proportion of which are *un*known to most of the present generation. *Unknown* is, however, printed *known*, and thus the point of the illustration is lost.

Fauna and Flora of New Guinea and the Pacific Islands

I HAVE just read, with very great interest, some anthropological and zoological notes on a trip up the "Fly River" in New Guinea, by Signor D'Albertis. From these notes it appears that the "heaps of dung" which have been supposed to indicate the presence of a rhinoceros in the island, are probably the excrement of the Casuarius. Signor D'Albertis also reduces the "tracks of buffaloes" to those of wild hogs; and the fabulous bird "with a spread of wings of 16 feet" (which, in a former letter, I conjectured might have been a Casuarius, with proportionately large wings added by the imagination of the explorers under the influence of excitement), turns out to be nothing more than a *Buceros ruficollis* with a spread of wings of "4 or 5 feet."

We have, therefore, no reason for modifying our views as to the relation which the fauna of New Guinea bears to the rest of the world. Signor D'Albertis mentions a few examples only of the New Guinea flora, but some of these are specifically identical with common South Pacific Island plants.

In connection with this subject, it may be interesting to some of your readers to know that I have just entered into an arrangement with a Danish botanical collector—Mr. Fritz Jensen—under which he will start from Samoa during the present month on a voyage through the Union, Ellice, and Gilbert Islands (Atolls), to collect for me in botany and zoology. On his return to Samoa in July, he will accompany me to the Loyalty Islands, where he will make a stay of four or five weeks collecting chiefly in botany. At the close of that period Mr. Jensen will proceed to the south-east coast of New Guinea (I have some hope of accompanying him), where he will spend about two months collecting.

Mr. Jensen has been residing with me for several months working at the Samoan flora, of which I have about 700 species in my collection. By the time he completes his trip I hope the collection will be of some value as material towards the preparation of a Flora of the Pacific Islands. S. J. WHITMEE

Samoa, April 3

Optical Phenomenon

I BEG leave to send you a brief account of a striking atmospheric phenomenon which was visible in this neighbourhood on the evening of the 27th ult. Hoping that some of your usual correspondents from the North of Ireland would have sent you a notice of it before this, I delayed writing to you (see vol. xiv. p. 231).

The phenomenon consisted of a pillar of light which rose vertically from the horizon, over the spot where the sun, then set, presumably was at the time, and reached an altitude of some 8°, or perhaps more. I first saw it about 8.45 P.M., when the sun was set about a quarter of an hour, but it was, no doubt, visible earlier, probably before sunset. As the sun moved under the horizon towards the north, the pillar moved in the same direction, still retaining its vertical position, but becoming gradually lower, until at last it disappeared about 9.40 P.M., the sun being then about 6° 30′ below the horizon. The breadth of the pillar was equal to the apparent diameter of the sun. Its colour when first seen was a pale yellow, which as time advanced changed to a golden yellow, and finally to a deep red. The pillar was brighter near the horizon than at a greater altitude, and its upper end was not well defined, but gradually faded away. My son, who was with me, observed that the edges of the pillar were slightly scolloped. The sun had been clear and very hot during the day, but there was a cool air from the north-east, which became colder towards sunset. I have heard that this phenomenon was also visible at Portadown and Tynan, in the County Armagh, and at Aughnacloy in this county.

I presume there can be no doubt that the pillar consisted of a succession of images of the sun overlapping one another, but it is not easy to see how these images were produced. A nearly horizontal stratum of dense air, whose surfaces were slightly inclined to one another, with a rarer medium above and below, might form such a multiple image, by successive reflections and partial refractions at the lower surface, the sun-beam which furnished the direct or principal image to any observer, A, furnishing the second, third, &c., images to observers behind him, so to speak, and sun-beams behind the former, successively furnishing A with the images forming the upper part of the pillar.

I understand that German physicists give this phenomenon the name of Sonnensäule—sun-pillar—and that they have published some speculations as to its origin. I hope some of your readers will kindly contribute information on this subject.

"Felix qui potuit rerum cognoscere causas."

Omagh, Co. Tyrone R. V. D.

P.S.—Since writing above I have learned that the "sun-pillar" was visible over a district of the north-east of Ireland, extending from Portrush in the north to Armagh in the south, and from Bangor (Belfast Lough) on the east to Omagh on the west. I have also heard from two intelligent correspondents that it was visible at sunset, when it attained an altitude of 30°; and from two others that it presented to them the appearance of being crossed by bands, alternately of a brighter and darker shade.

Freezing Phenomenon

I HAVE waited to see whether anyone else would notice a letter that appeared in NATURE, vol. xiv. p. 191, from Mr. Power, under the above heading. Failing such notice, may I point out that the phenomenon to which he refers has already been described. Plumes produced by the crystallisation of water form the frontispiece to Dr. Tyndall's Lectures on Light (Longmans, 1873), and a description of them is given in p. 257 of that volume.